of the genus *Pomarea* ever existed in Tonga, it would seem appropriate to treat *P. nigra tabuensis* as a synonym for *Lalage maculosa tabuensis*.

Acknowledgements: I am grateful to Nigel Collar for his comments on an earlier draft of this paper.

References:

Forster, J. R. 1844. *Descriptiones Animalium* quae in itinere ad maris australis terres per annos 1772, 1773, et 1774 suscepto collegit observavit et delineavit J.R.F. served Berlin.
Gräffe, E. 1870. Die Vögelwelt der Tonga Inseln. *J. Orn.* 18: 401–420.
Hoare, M. E. (ed.) (in press). *Forster's Manuscript Journal.* Hakluyt Society.
King, W. B. (ed.) 1978–1979. Red Data Book. Vol. 2 Aves. I.U.C.N., Morges.
Layard, E. L. 1876. Notes on the birds of the Navigators' and Friendly Islands, with some additional ornithology of Fiji. *Proc. Zool. Soc., Lond.* 490–506.
Mathews, G. M. 1929. (Nomenclatorial note.) *Bull. Brit. Orn. Cl.* 49: 59–60.

Address: David Todd, Dressors, Eversley, Hampshire.

Behavioural notes on the White-eared Barbet *Stactolaema leucotis* in Kenya

by Lester L. Short and Jennifer F. M. Horne

Received 27 August 1983

The White-eared Barbet *Stactolaema leucotis* is a little known capitonid from eastern and southern Africa. One major report (Oatley 1968) covered some breeding and other aspects of its biology in Natal, the southernmost part of its range. Otherwise, there are published notes on its behaviour in captivity (Yates 1975) and casual mention of certain habits in such works as those of Moreau & Moreau (1937, 1939). We report details of its behaviour in Kenya to elucidate aspects not treated or casually treated by other authors and to present new information.

Our studies were conducted in evergreen forest at 1550–1700 m on the crest and upper west slope of the Chyulu Hills, 29 km WSW of Mtito Andei in south-central Kenya (2°47′ S, 37°56′E), 8–15 November 1982. The forest and its avifauna have been discussed by van Someren (1939). One peculiarity is the virtual absence of surface water or running streams, except immediately after rain, for the soil is volcanic and very porous. During our visit rain was plentiful, occurring daily (sometimes as often as 4 or 5 times a day), and the forest was often enshrouded in fog. The forest is more or less continuous along the crest at the southern end of the Chyulu Hills, with frequent isolated patches on adjacent slopes. It is much less extensive, but with more forest edge and isolated patches than in van Someren's time, due to cutting and grazing activities of local tribes. Common forest barbets are the White-eared Barbet and the Moustached Green Tinkerbird *Pogoniulus leucomystax*, while forest edges and the isolated patches of forest support numbers of Spot-flanked Barbets *Tricholaema lachrymosa*.

Its social habits, vocalizations, white "ear" patch and belly, and black breast make the White-eared Barbet conspicuous. We studied 3 groups on the crest of the Chyulu Hills in a much-dissected forest area c. 1 km long.

Although their areas of activity are in fact connected by forest, both trails and the configuration of intruding burnt and cut-over areas more or less isolated the 3 groups, each of which occupied a forest area of 200 x 400 m. Individuals frequently flew the 50–200 m from the forest to nearby small isolated patches of forest, the largest of which conceivably could support a pair or group of White-eared Barbets. Kenyan birds are of the subspecies *kilimensis*; 6 males weighed 53–61g (mean 57.3g), 5 females 51.5–58g (mean 54.4g).

Observations

Activities of the White-eared Barbets centred about the nesting (and roosting) hole, its immediate surroundings usually including a favoured perch with a good view from it in at least several directions, and fruiting (fig) trees. Nest site A was 50 m inside the edge of the forest, and consisted of a hole facing east 15 m up a dead, well-rotted tree stub broken off at 18 m, at which height the stub was 45–50 cm in diameter. Vines and lianas wound around the stub, to its top on the south side, and a tendril often used as a perch by the barbets was beside the entrance to the nest. A dense but upwardly open tangle to the east and northeast of the stub probably marked the fallen top of the tree. Two trees just south of the nest site provided perches on which interactions occurred among adults, and were used for surveillance by the barbets. Six adults roosted in the nest with at least 2 young birds that sporadically reached the nest entrance late in our stay.

Site B was 20 m inside the forest edge on a steep slope, in a double-topped, vine-covered dead stub 12 m high, the nest entrance being just below the broken top of one branch that was 30 cm in diameter at that point. Vines ceased just below the entrance, which faced southwest. The nest tree has been identified by Jan B. Gillett, of the Kenyan National Herbarium as *Tabernaemontana johnstonii* Stapf, family Apocynaceae. Two small trees with several dead branches southwest of the nest provided preening and surveillance perches for adults. Five adults were incubating at this nest.

Site C was 8 m from an open area on a dense, heavily forested and very steep slope, in a dead stub 8.5 m high, 5.8 m above ground, the entrance slightly oval from side-to-side and facing SSW. The stub was c. 36 cm in diameter at the nest, and differed from the other sites in lacking vines. Here 6 adults were incubating eggs.

These observations confirm the regular occurrence of more than merely a pair at nesting situations. Nests in the study sites, and in other cavities probably used by barbets previously, had no other excavated cavities near them, indicating the absence of colonial nesting (unlike the case in forest barbets *Gymnobucco* (Short & Horne 1983)) near them, and suggesting long use of a particular cavity by a barbet group.

These nesting sites are not directly comparable with those of Austen's birds (Oatley 1968), which nested in a lone *Erythrina* tree on his open lawn. He had but 2 adults through incubation, after which a third adult joined the pair in roosting nightly in the nest, and helped raise the young. Eight birds roosted in that nest after the 3 adults had raised 5 young. Elsewhere in South Africa Oatley noted up to 11 birds roosting in one cavity and he mentions J. Vincent having seen 17 enter a hole, but the locality was given as in "the Congo" (Oatley 1968: 12), where in fact the White-eared Barbet does not

occur. At all our 3 sites the entire group (5–6 adults) roosted in the nests, both during incubation, and (in at least one case) after hatching occurred.

Oatley (1968) noted visits of a Greater Honeyguide *Indicator indicator* to Austen's nest after eggs had been laid, but with no apparent attempt to lay by the honeyguide (presumably a female, although its sex is not mentioned). We saw no honeyguides about our nests, but in a small forest patch downslope from the study area on 16 November we found 2 White-eared Barbets and a pair of Spot-flanked Barbets alternately chasing, attacking and calling at a Lesser Honeyguide *I. minor* that remained in the patch for 1 hour, despite constant attacks by one or the other of the barbets. Lesser Honeyguides often are parasitic on similarly sized barbets, e.g. *Lybius torquatus* and *L. leucocephalus* (Short & Horne 1979).

The adult White-eared Barbets were always in evidence round the nests where incubation was in progress, and at least one barbet was usually in or near the nest where barbet young were being fed. That surveillance is important is indicated by the shrieking alarm call given by an adult spotting a potential predator, the call bringing the other adults silently to the nest site, and causing the young to become silent. Predators drawing this response on 3 occasions were an African Goshawk *Accipiter tachiro* cruising through the forest (which then pursued a barbet with no success), and in 2 cases, a Crowned Eagle *Stephanoaetus coronatus* that once perched in a favourite feeding tree of the barbets, drawing repeated calls for over a minute before it flew off.

Adults foraged for figs and other fruits, but also hawked for insects occasionally, and not only to feed the young. Yates (1975) had previously observed that a captive White-eared Barbet frequently took spiders and flying hornets, bees, and other insects that entered its cage, besides fruit. We frequently saw foraging White-eared Barbets moving slowly along moss-draped limbs of trees, apparently seeking insects.

As Moreau & Moreau (1937) noted, the White-eared Barbet is pugnacious, and does not tolerate close approach by other species, attacking and usually driving off or supplanting species their size or smaller. The White-eareds vocally responded occasionally to songs of the 2 sympatric barbets. One once supplanted a perched Spot-flanked Barbet, and we twice saw a White-eared chase a Spot-flanked Barbet and, once, a Moustached Green Tinkerbird, but we do not know what had transpired prior to our observations. Members of a group when close to one another may engage in allopreening (seen 14 times). Comfort movements include direct scratching, and stretching of one wing and the leg on the same side, then those of the other side or both wings simultaneously up over the body.

Vocalizations

S. leucotis gave no song as such. The major vocalization is a *skreek, zzheep,* or *kyeek,* aptly described by Moreau & Moreau (1932: 302) as "a harsh uninflected and undistinguished squawk" and given under circumstances similar to those in which Grey-throated Barbets *Gymnobucco bonapartei* (pers. obs.), and at least 2 of the other 3 species of *Gymnobucco* (see Chappuis 1981) utter their loud *pyew* call. It may be uttered singly or in loose series (e.g. a *skreek-zeep-zeep-*) during fights or when there is a disturbance (e.g. arrival of a group of hornbills at a feeding tree used by the barbets), or in alarm, as noted above. Other vocalizations mark interactions of varying intensity: 1) a loud, honeyguide-like trill, a *brdddiititit* or *triiddddddt* resembling rather

closely the rattling trills of *G. bonapartei* (pers. obs.) and which at high intensity may be compounded with *skreek*-like notes, a *zzeep-zzeep-ddddt, ddddeet-it, bddd-eeee-eet,* or *ddd-eeep-dd-d-dttt*; 2) lower *skreek*-like calls, a *pyeep*; 3) low trills or chittery calls, a *skree-eee-yi-ii-ii-ii* or *nyi-ii-ii-ii* or *d-dddtchip*; 4) low, buzzy *bdddzzzzzz* or *zzz-zzz-zzip* notes; 5) low humming *mmmmmm* notes, and 6) grating sounds stimulated by playbacks among 3 adults rendered *dd-pddeeddd-skree-ee-ee-chewp- chewp*. The last 3 sets of vocalizations recall similar ones of the Green Barbet *S. olivacea olivacea*. Nestlings utter a *wi-wi-wi-wi-* begging call, which can be a louder *chip-ip-ip-ip*.

Bill wiping is a common display of seemingly agitated birds, resulting in low mechanical sounds that are audible at 20 m, hence to interacting birds during encounters. Movement during interactions is marked by loud rustling wing noises that surely function aggressively, e.g. when an incoming bird announces its intention to supplant another. Finally, on changeover during incubation we thrice observed the incoming bird to drum-tap, *ddd,* softly with its bill on a stub near the hole before flying to it, although low trill or skizzing *t-ch, t-ch, t-ch--* notes at the entrance were more usual at changeover. So, in fact this species uses a woodpecker-like tapping signal at times.

Visual displays

Those observed most commonly were bill wiping, described above, flicking of the wings during interactions, and side-to-side swinging of the body and especially the tail, also during interactive encounters. Aggressive birds sidling on foot along a branch assume a horizontal position, pointing the bill at an antagonist, or possibly opening the bill widely in a gape (the inside of the bill is blackish and the tongue pink). Meetings at the nest are marked by diverse interactions, quite likely relating to the status of the birds within the group. Sometimes there is bowing, and swinging of the body and tail. One especially excited incoming bird after so displaying at the hole, took off in chase of the adult which flew out, instead of entering the nest. Other interactions away from the nest include wing flicking, and involve first one then the other bird hopping over each other, turning and facing its antagonist, with tail swinging and bill wiping as it supplants it. Tail cocking occurs at times, and together with tail swinging is one response of some birds to playback of *skreek* calls. Once an incoming bird, at a nest presumed to contain eggs, cocked its tail; the bird inside called *skreek*, at which the second bird quivered its wings and called *dddatt*. During intense interactions, and rarely also in changeovers, one bird spreads out its white feathers "like white wisps to the sides" (from field notes, LLS), also spreading out its rump and flank feathers to make those areas conspicuous.

Soliciting was observed only 4 times, one bird drooping its wings, flipping them up and down and giving a fast buzzy call ending in *yip* notes. Courtship feeding was observed once at the nest containing young; the *adult* which came to change over fed an adult which came to the entrance and then *both* entered the nest together. Young birds when they climb to the nest entrance and call are conspicuous by virtue of their yellow-based, dark-tipped bill, perhaps adding visually to the vocal begging display. Sometimes birds approaching the nest do so in a long gliding flight, possibly a display. A definite flight display seen twice was a circular flight by 2 birds around and around the nest containing young, whether by the breeding pair or not is uncertain. A flutter flight display is seen occasionally, with wing sounds

audible at a considerable distance, when one bird flies in to supplant another, the fluttering giving way to wing flicking as the incoming bird alights.

These visual displays mainly closely resemble those known for the Green Barbet (Short & Horne 1980), although many of them (tail cocking, bowing, bill wiping) are widespread among capitonids such as species of *Gymnobucco, Tricholaema* and *Lybius*, as well as of *Stactolaema*. However, the circular flight display of the White-eared Barbet is as yet unknown in other barbets.

Incubation

Observations of incubation at sites B and C in continuous periods of 20 minutes or more on 4 days (169 minutes total) showed 14 incoming or outgoing events at intervals of 3–24 minutes, one per 12 minutes. During a dozen additional occasions of interrupted or brief observations near these nests, there was always one bird present in the nest (and probably at all other times). Sometimes a second bird would enter, and at other times there would be a changeover, one departing and the other entering the nest. At times as many as 3 individuals were in the nest at once during the day. Playback of various vocalizations drew an incubating bird to the entrance, and twice, apparently, briefly enticed it out of the nest, to which it quickly returned; at other times when a bird flew out and away immediately on hearing the playback, we had reason to believe (from subsequent events, or the appearance of a second bird briefly from inside the nest entrance) that one bird was still in the nest. The rather short intervals of incubation probably reflect the sociality of this barbet and the actual numbers of adults incubating. The changeover rate renders the nest site more conspicuous because of frequent activity about the hole, but any possible resulting predation is offset by the presence of one or more adults within and about the nest at all times. These sparse observations are the first data on incubation and changeovers in this barbet.

The incubation period has been estimated at 14–18 days from Austen's observations (Oatley 1968), but accurate data are needed. The clutch is 2–6 eggs, apparently 4–6 in southern Africa and with fewer eggs in East Africa; young in the nest at site A certainly numbered no more than 3, and Moreau & Moreau (1937) found only 2 young in a Tanzanian nest.

Feeding of young

We observed feeding of young at site A for 514 minutes in 6 periods of 30–250 minutes during parts of 3 days in the middle of the nestling period. Austen's observations (Oatley 1968—360 minutes over 4 days) were both early and late in the nestling period. Moreau & Moreau (1937) reported 30 berries fed to 2 young during 90 minutes in northeastern Tanzania. We were too far distanced usually to determine the food brought to the young.

From 11.40–15.50 on 10 November we saw 64 apparent feeding visits by the 6 adults, respectively at 10, 18, 17 and 18 times per hour (average 15.4 per hour). Visits for feeding were as brief as 7 sec, but some birds remained in the nest until replaced by another feeding adult, or even longer. Those birds flying to the nest and appearing to leave on their own after feeding (43 of 60, or 72%) averaged 37.3 sec in the nest, whereas birds apparently remaining in the nest until another adult "forced" them out stayed for 74 sec on average; though of course we could not be certain that the bird leaving was the one which had immediately preceded the newcomer to the

nest, for at times there were 2 or more birds within the chamber for a period. In contrast, in late afternoon, when adults presumably forage for themselves, between 16.12 and 16.51 the same day, only 4 feedings occurred, corroborating Oatley's (1968) report from Natal, where there are 2 hours longer daylight, but where probably more young are raised per nest.

Next day there were 23 feeding visits between 10.50 and 11.30, when as many as 3 adults spent a considerable time together in the nest after feeding, and only 10 times did one bird leave within 45 sec of the arrival of another with food. In the other cases, 60–300 sec elapsed before one bird departed. Between 15.38 and 16.29 on 14 November there were 21 feeding visits (24.7 per hour), with rapid turnover again (21.5 sec per "feeding visit"). Thus, the hourly feeding rate varies greatly, from 10–25 per hour, the overall average of 17.6 being rather greater than the 14 in Natal (Oatley 1968). On 11 November 2 adults arrived at site A with food at 18.07, and remained in the nest for roosting. The other 4 adults arrived, whether with or without food could not be determined, between 18.10 and 18.14, all 6 adult birds thus going to roost within less than 7 minutes.

Many times the barbets leaving stopped to perch, preen, or even feed near the nest. On at least 3 occasions the same barbet fed twice successively, obtaining food about the nesting tree by flycatching or by gleaning. Others, on at least 12 occasions, obtained food by hawking near the nest, or by gleaning in vines or, twice, from the top of the stub in which the nest was situated. Thus, food is obtained rather opportunistically (cf. Yates 1975), and not always from so far away as Oatley (1968) suggested. At times all the birds seemed to arrive from the same direction, all from the direction of fruiting fig trees.

Food was carried in the bill, and included berries and small, undetermined particles. No large fruits were obtained. Large insects were visible on some 20 occasions, probably orthopterans, some perhaps armoured. These were beaten against a branch or the stub before being carried to the nest.

Nest santitation

We were generally too far away to discern faecal material carried from the nest, because of bad light, or the fact that the barbets often sped out of the nest with no chance for close observation, or because of the commotion surrounding the meeting of incoming and outgoing barbets. Nonetheless, in 19 cases obvious faecal material was seen in the bill of a barbet pausing at the nest entrance in good light. Oatley (1968) reported Austen's observations of 28 removals of faecal material in 74 feedings, a rate of 38%.

Gonadal development

On 15 November 2 adults were obtained from a nesting group of 5–6 adults to the east of the study area. Both proved to be adult males, each with an incubation patch, and their testes were identical in size (6 x 5 mm). It is our observation generally in social African barbets that the gonads are more or less equally enlarged in all members of a group, except that the (one) breeding female has larger ova or is otherwise (yolked ova, egg in oviduct, ruptured follicles) in a more advanced reproductive state than other females of the group.

Acknowledgements. We thank A. C. Cameron and T. Ngelu for assistance in the field, G. R. Cunningham-van Someren of the National Museums of Kenya for suggestions, maps and copies of various reports used in the field, and the authorities of the Kenyan Ministry of Tourism and Wildlife for collecting permits and for facilitating our field research. Our colleagues Dean Amadon and G. Stuart Keith kindly commented on an earlier version of this report. The studies reported were under scientific authorization from the Kenyan Office of the President. Financial help came from the L. C. Sanford and Ritter-Eisenmann funds of the American Museum of Natural History.

References:

Chappuis, C. 1981. Supplément Sonore. Illustration sonore de Problèmes bioacoustiques posés par les Oiseaux de la Zone Ethiopienne. *Alauda* 49: 35–58.

Moreau, R. E. & Moreau, W. M. 1937. Biological and other notes on some East African Birds. *Ibis* 79: 152–174.

— 1939. Observations on some East African Birds. *Ibis* 81: 296–323.

Oatley, T. B. 1968. Observations by W. M. Austen on the breeding biology of the White-eared Barbet, *Buccanodon leucotis* (Sundevall). *Lammergeyer* 8: 7–14.

Short, L. L. & Horne, J. F. M. 1979. Vocal display and some interactions of Kenyan honeyguides (Indicatoridae) with barbets (Capitonidae). *Amer. Mus. Novit.* No. 2684.

— 1980. Vocal and other behaviour of the Green Barbet in Kenya. *Ostrich* 51: 219–229.

— 1983. A review of duetting, sociality and speciation in some African barbets. *Condor* 85: 323–332.

van Someren, V. G. L. 1939. Reports on the Coryndon Museum Expedition to the Chyulu Hills. II. The Birds of the Chyulu Hills. *J. East Afr. and Uganda Nat. Hist. Soc.* 14: 15–129.

Yates, E. 1975. Notes on a White-eared Barbet. *Avicult. Mag.* 81: 197–199.

Address: Dr. L. L. Short, American Museum of Natural History, New York, New York, 10024, U.S.A.; J. F. M. Horne, National Museums of Kenya, Nairobi, Kenya.

A new downy pteryla in passerine birds

by V. Y. Ilyashenko

Received 24 October 1983

Recent treatments of the natal pterylosis of passerine birds in the Neotropics (Collins 1963, 1973, Collins & Kemp 1976, Ingels 1979), in Africa (Markus 1970, 1972) and in Asia (Ilyashenko 1981) have all followed Wetherbee (1957) in the terminology and in nearly all cases in the basic pattern of tracts he outlined. An additional tract in the cervical region has been reported by Collins & Bender (1977). I report here a new downy pteryla found in some Palaearctic passerine birds during field studies and when examining material in the collection of the Zoology Institute, USSR Academy of Science (Leningrad).

The new downy pteryla is situated at the base of the upper side of the wing between the innermost neossoptiles of the alar tract and the lateral margin of the humeral tract. These downs are attached to teleoptile feathers of the posthumeral tract (Lucas & Stettenheim 1972) (=pteryla caudohumeralis—Lucas 1979) and are here considered as posthumeral neossoptiles. These neossoptiles are usually represented by a partially oblique row of 3, rarely 2, reduced down about 1–2 mm long. They are not found in all individuals of a species nor even in all nestlings in the same nest. To date, posthumeral neossoptiles have been recorded in the following species: Raven *Corvus corax*